

Claims

1. Process for continuously decorating packages with convex surfaces wherein the packages are moved on a transport conveyor with a superimposed autorotation and the decorations are moved on a carrier conveyor tangentially past a transfer location with a constant velocity, wherein the decorations are sequentially transferred to the packages through the application of pressure and heat and wherein the decorations undergo a heat post-treatment, characterized in that
 - the transport conveyor (4) and the carrier conveyor (7, 7') move in opposite directions, wherein the ratio of the spacing between the packages (5) on the transport conveyor (4) to the velocity of the transport conveyor (4) is the same as the ratio of the spacing between the decorations on the carrier conveyor (7, 7') to the velocity of the carrier conveyor (7, 7'),
 - in the region of the transfer location, the rotating packages (5) are accelerated to a circumferential velocity corresponding to the velocity of the carrier conveyor (7, 7'),
 - the required heat is supplied to the carrier conveyor (7, 7'), and
 - the rotating packages (5) are subsequently moved past a stationary and temperature-controlled heat source.
2. Process according to claim 1, characterized in that the rotation of the packages (5) is driven by the movement of the carrier conveyor (7, 7').

3. Process according to claim 2, characterized in that each package (5) is already accelerated by the carrier conveyor (7, 7') before reaching the transfer location.
4. Process according to claim 1, characterized in that the required heat is supplied
5 to the carrier conveyor (7, 7') before or at the transfer location.
5. Process according to claim 4, characterized in that the heat-up time of the carrier conveyor (7, 7') depends on the velocity of the carrier conveyor (7, 7').
6. Process according to claim 5, characterized in that the heat-up time of the carrier conveyor (7, 7') is controlled automatically.
- 10 7. Process according to claim 1, characterized in that the packages (5) made of plastic are stabilized by blown-in compressed air.
8. Apparatus for continuously decorating packages with convex surfaces, the apparatus comprising:
 - a driveable continuous transport conveyor with uniformly spaced, driveable and
15 rotating receiving means for the packages,
 - a driveable continuous carrier conveyor with uniformly spaced decorations, and
 - a contact region between the transport conveyor and the carrier conveyor, said contact region forming a transfer location,

- wherein there are disposed in the region of the transfer location means for applying pressure onto the carrier conveyor in the direction of the packages and means for heating the decoration, and

5 - following the transfer region, there are disposed means for heat post-treatment, characterized in that

- the drive means for the transport conveyor (4) and the carrier conveyor (7, 7') are designed for opposing directions of movement,
- the means for applying pressure and heat are formed by a guide element,
 - * which is moveable transversely to the direction of movement of the carrier conveyor (7, 7') and which is pre-loaded, and
 - * which is formed as a heating element, and
- the means for heat post-treatment comprise a stationary temperature-controlled heat source and a transport conveyor for the packages (5).

10 9. Apparatus according to claim 8, characterized in that the receiving means (6) for the packages (5) are designed to rotate freely and that each receiving means (6) can be driven by the carrier conveyor (7, 7') via the packages (5).

10. Apparatus according to claim 9, characterized in that the carrier conveyor (7, 7') is guided in such a way that a region of the carrier conveyor (7, 7') from
 20 which a decoration has been removed, makes contact with at least one other package (5).

11. Apparatus according to claim 8, characterized in that the receiving means (6) for the packages (5) comprise a separate drive.

12. Apparatus according to claim 8, characterized in that the receiving means (6) comprise a separate drive for providing a velocity which is smaller than the required velocity, and that the required velocity is generated through contact between the packages (5) and the carrier conveyor (7, 7').
13. Apparatus according to claim 8, characterized in that the guide element is preceded by a moveable heating element (9, 9') with a contact surface, wherein the size of the contact surface between the heating element (9, 9') and the carrier conveyor (7, 7') can be adjusted continuously between zero and a maximum value.
14. Apparatus according to claim 13, characterized in that the contact surface of the heating element (9, 9') has a convex shape.
15. Apparatus according to claim 14, characterized in that the moveable heating element (9, 9') is adapted for pivotal movement and comprises an actuating drive for providing a pivoting path which depends on the velocity of the carrier conveyor (7, 7').
16. Apparatus according to claim 15, characterized in that the pivoting path can be adjusted automatically.
17. Apparatus according to claim 14, characterized in that the moveable heating element (9, 9') is constructed with a lateral pivot point and with a lower contact surface and that the pivoting path is derived from the ratio of the mass of the heating element (9, 9') and the velocity-dependent lifting force of the carrier conveyor (7, 7').

18. Apparatus according to claim 13, characterized in that the pressure head (10, 10') is formed as a heating element and the moveable heating element (9, 9') is formed as pre-heating element.

19. Apparatus according to claim 8, characterized in that the heat source of the post-treatment unit comprises an electrically powered hot plate (19) with a flat or concave hot surface (21) and a controller (20) which is adjustable to a nominal temperature.

20. Apparatus according to claim 19, characterized in that the flat hot surface (21) relates to a linear transport conveyor and the concave hot surface (21) relates to a circular transport conveyor for the packages (5) and that the length of the effective hot surface (21) is specified for a nominal post-heat-treatment time.

21. Apparatus according to claim 20, characterized in that the packages (5) are arranged on the transport conveyor of the post-treatment unit in such a way that they can rotate freely, and are driven by the stationary hot plate (19).

22. Apparatus according to claim 8, characterized in that the heat source of the post-treatment unit comprises a nozzle (22), a temperature-controlled hot air generator (23), a volume-controlled bypass valve (24) and a temperature and volume controller (25), and that the packages (5) comprise a separate drive for the rotation.